Chapter 17. Usage of N/A, UNK and NULL

17.1 Interpretation of N/A, UNK, and NULL

During the completion of data product labels or catalog files, one or more values may not be available for some set of required data elements. In this case PDS provides the symbolic literals “N/A”, “UNK”, and “NULL”, each of which is appropriate under different circumstances.

17.1.1 N/A

“N/A” (“Not Applicable”) indicates that the values within the domain of this data element are not applicable in this instance. For example, a data set catalog file describing NAIF SPK kernels would contain the line:

```
INSTRUMENT_ID = "N/A"
```

because these data sets are not associated with a particular instrument.

“N/A” may be used as needed for data elements of any type (i.e., text, date, numeric, etc.).

17.1.2 UNK

“UNK” (“Unknown”) indicates that the value for the data element is, in this case, not known and never will be. For example, in a data set comprised of a series of images, each taken with a different filter, one of the labels might contain the line:

```
FILTER_NAME = "UNK"
```

if the observing log recording the filter name was lost or destroyed, the name of the filter is not otherwise recoverable.

“UNK” may be used as needed for data elements of any type.

17.1.3 NULL

“NULL” is used to flag values that are *temporarily* unknown. It indicates that the data preparer recognizes that a specific value should be applied, but that the true value was not readily available. “NULL” is a placeholder. For example, the line:

```
DATA_SET_RELEASE_DATE = "NULL"
```

might be used in a data set catalog file during the development and review process to indicate that the release date has not yet been determined.

Note that all “NULL” indicators should be replaced by their actual values prior to final archiving of the associated data.

17.2 Implementation Recommendations for N/A, UNK, and NULL

The figurative constants defined above require special values for storage in data base systems. The PDS has the following recommendations for software intended to support PDS labels and catalog objects:

1. In the case of character fields, the explicit string can be stored in the corresponding data elements without further modification. This approach can also be taken where date and time data types are stored as strings.

2. Numeric fields require special flag values to represent the “N/A”, “NULL” and “UNK” indicators. Table 17.1 provides suggested standard flag values for each case.

In creating index files based on element values extracted from PDS labels, there are two options for dealing with “N/A”, “NULL”, and “UNK” in non-string columns:

1. The character strings can be used explicitly in the index. Note, however, that in this case the DATA_TYPE of the column may be forced to “CHARACTER”, since, for example, encountering the string “NULL” in what is otherwise a numeric column would cause a read failure.

2. The character strings can be replaced with an appropriate numeric constant. In this case the substitution is indicated in the corresponding column definition by including the NOT_APPLICABLE_CONSTANT, NULL_CONSTANT or UNKNOWN_CONSTANT elements as needed.

Table 17.1: Numeric values for N/A, UNK, NULL

	Signed Integer (4 byte)	**Signed Integer (2 byte)**	**Unsigned Integer (4 byte)**	**Unsigned Integer (2 byte)**	**Tiny Integer (1 byte - unsigned)**	**Real**
N/A	-2147483648	-32768	4294967293	65533	locally defined	-1.E32
UNK	2147483647	32767	4294967294	65534	locally defined	+1.E32
NULL	NULL*	NULL*	NULL*	NULL*	NULL*	NULL*

* “NULL” refers to a system-defined null value. The availability of NULL as a universal value across data types in some data management systems simplifies the implementation of the figurative constant "NULL". However, if a system "null" is not available, then either a) an arbitrary value can be chosen, or b) the meanings of UNK and NULL can be combined and the token or numeric representation of UNK used.